DOCUMENT RESUME

ED 354 871 IR 015 961

AUTHOR Gooler, Dennis D.; And Others
TITLE Defining Education's Role in Telecommunications Policy. Proceedings and Recommendations from an Invitational Working Meeting (Wye Woods, Maryland, October 10-11, 1991).
INSTITUTION Aspen Inst., Queenstown, MD.; North Central Regional Educational Lab., Oak Brook, IL.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE 92
CONTRACT RP91002007
NOTE 73p.
AVAILABLE FROM North Central Regional Educational Laboratory, 1900 Spring Road, Suite 300, Oak Brook, IL 60521 (Order No. TCP 921, $8.50).
PUB TYPE Collected Works - Conference Proceedings (021)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Educational Policy; Educational Technology; Elementary Secondary Education; Federal Government; Government Role; *Policy Formation; Public Agencies; Role of Education; *Telecommunications
IDENTIFIERS *Office of Educational Research and Improvement

ABSTRACT

This conference convened 35 leaders and experts in telecommunications and education in order to consider ways in which the educational community can be more involved and effective in telecommunications policymaking and to promote positive uses of telecommunications in education. The meeting also addressed the role in these processes for the U.S. Department of Education's Office of Educational Research and Improvement. Attendees included representatives from federal, state, and local public and private organizations from both the telecommunications sector and the educational community. This report details recommendations for educators, collaborative projects and agencies, and federal and state governments. Suggestions for priority activities for the Department of Education are summarized. Attachments include a list of participants and the following papers: "A Call for Coordinated Federal Telecommunications Policies Affecting Education" (Susan Fratkin); "Defining Education's Role in Telecommunications Policy: A Response to Susan Fratkin" (Louis A. Bransford); "Telecommunications for Education: State Policy Issues" (Richard T. Hezel); "Telecommunications Policies and the Needs and Goals of Educators" (Dennis D. Gooler); and "Principles for Educational Community Participation in Telecommunications Policy" (Charles M. Firestone). (ALF)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED354871

Defining Education's Role in Telecommunications Policy

Proceedings and Recommendations

Invitational Working Meeting
Wye Woods Conference Center
October 10-11, 1991

NCREL
North Central Regional Educational Laboratory

The Aspen Institute
Communications and Society Program

BEST COPY AVAILABLE

120596

Published in 1992 by the
North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, Illinois 60521
708/571-4700

Order Number: TCP 921

Price: $8.95

DEFINING EDUCATION'S ROLE IN TELECOMMUNICATIONS POLICY

Proceedings and Recommendations
Invitational Working Meeting
Wye Woods Conference Center
October 10-11, 1991

Sponsored by

NORTH CENTRAL REGIONAL EDUCATIONAL LABORATORY
Oak Brook, Illinois

and

THE ASPEN INSTITUTE
Program in Communications and Society
Washington, D.C.

Written by:
Dennis D. Gooler
North Central Regional Educational Laboratory

Charles M. Firestone
Catherine Clark
The Aspen Institute

This report was produced in whole or in part with funds from the Office of Educational research and Improvement (OERI), U.S. Department of Education, under Contract Number RP91002007. The content of this report does not necessarily reflect the views of OERI, the Department of Education, or any other agency of the U.S. Government.

Table of Contents

Executive Summary iii

I. Introduction 1

II. The Meeting 3

III. Summary of Major Points 5

IV. General Recommendations for Action 9

General Principles and Goals 9

Recommendations to Educators 10

Recommendations for Collaborative Projects and Agencies 11

Recommendations to Federal and State Governments 12

V. Suggestions for Priority Activities 15

VI. The Authors' Perspective 17

Attachment A: Participants 19

Attachment B: Background Papers 27

Fratkin, Susan. *A Call for Coordinated Federal Telecommunications Policies Affecting Education* 29

Bransford, Louis A. *Aspen Institute Defining Education's Role in Telecommunications Policy: A Response to Susan Fratkin* 43

Hezel, Richard T. *Telecommunications for Education: State Policy Issues* 47

Gooler, Dennis D. *Telecommunications Policies and The Needs and Goals of Educators* 57

Attachment C: Firestone, Charles M. *Principles for EducationalCommunity Participation in Telecommunications Policy* 67

Executive Summary

The North Central Regional Educational Laboratory and the Aspen Institute's Program on Communications and Society convened 35 representative leaders and experts in telecommunications and education for a two-day conference entitled *Defining Education's Role in Telecommunications Policy*. The meeting, held at the Aspen Institute's Wye Woods Conference Center on October 10-11, 1991, included representatives from federal, state, and local public and private organizations from both the telecommunications sector and the educational community. The purpose was to consider ways in which the educational community can be more involved and effective in telecommunications policymaking and to promote positive uses of telecommunications in education. The meeting also addressed the role in these processes for the Department of Education's Office of Educational Research and Improvement (OERI), which funded the meeting.

Policymaking Forums

The sessions began with a discussion of the various federal, state, and local forums for telecommunications policy decision making. There are many agencies and departments that look at issues relating to telecommunications and education. Most notably are the Federal Communications Commission; the Departments of Commerce, Justice, and Education; state public utilities commissions; governors' offices; local city councils; and many legislative committees. There is no single point inside or outside the government where education's voice is funnelled for input into telecommunications policy.

Education's Telecommunications Needs

Clearly, telecommunications and computer technologies are arriving in the schools and even more are needed. These rapidly changing and converging technologies offer impressive new ways to bring quality educational experiences to students both in and out of the classrooms. More importantly, advanced information technologies and services will provide schools with the tools to prepare students adequately for work and citizenship in the coming century. However, educators are already experiencing problems with the compatibility, cost, and user friendliness of some of the systems. At this time, there is little or no coordination among schools and other government agencies to aid educators in selecting and using telecommunications systems, and there are few standards upon which to rely. As telecommunications systems and applications

develop, education appears to be a secondary actor in the process. Simply put, the educational community is not sitting at the telecommunications policymaking table where important decisions are being made that will have a significant impact on education in the future.

Schools need to connect to the national telecommunications highways much like communities need on- and off-ramps to the interstate transportation highways. Many classrooms do not have even telephone lines, for example; while other higher band applications for schools, such as videoconferencing and high speed computing, are already commercially available.

Participation in Policymaking Process

To participate adequately in the Information Age, schools will need a massive investment in communications and on-premises educational technology. The nation needs a vision of teaching and learning that recognizes an active learning, multiple resources, a facilitating teaching environment, and the positive role technologies might play in schools. The roles of teacher, student, and classroom will all change, and technology will play a major part in this transformation. The challenge is to arrive at a consensus on that vision, a vision that allows for flexibility in instructional approaches in reaching the goals of improved learning. The vision must consider how schools can control their own destiny, and pay for the costs of education. Moreover, the vision must be guided and bound by a commitment to equity among students and school districts, lest inequities of the past be exacerbated by technologies.

Recommendations

Meeting participants recommended a variety of actions. The Report details these recommendations. Generally, participants suggested that the country should keep in mind the need for equity of access to educational opportunities made possible through telecommunications. They emphasized that telecommunications is a means to the broader end of quality education from preschool through continuing education at retirement. Systems should be user friendly and support the user; teachers should be adequately trained for both teaching and learning by advanced information systems. Researchers need to assess the impact of technology on learning on a regular basis. The group recommended that a task force look at the impact of telecommunications on communities from an educational and value perspective. Educators should make the public and legislators aware of the impact of technology on education to gain support where appropriate. This can best be done by documenting the demand and need for telecommunications applications in the schools.

The group singled out the need to adopt hardware and software standards to help administrators in the difficult decision of what to purchase, so that systems purchased will not be obsolete or incompatible with other systems. They suggested, for example, that educators adhere to the de facto Internet and NREN standards for network protocols. They recommended that the government promote access by students and teachers to diverse information resources. This could be achieved by: mandating agencies to have such access as a goal, funding demonstration projects, coordinating various agencies' activities for the purpose of facilitating the uses of telecommunications in education, subsidizing educational users of telecommunications where appropriate, and facilitating the resolution of accreditation and certification problems across state lines.

In particular, the group formulated recommendations to the Department of Education. It should monitor and participate in telecommunications policy activity where appropriate, disseminate useful information to the educational community, alert others and encourage their participation in the policy processes, and promote interactions among telecommunications specialists and educators. The Department and other federal and state agencies should improve their interactions among each other, particularly with respect to telecommunications and educational technology applications. Indeed, chief executive officers of public and private organizations should meet to address the major issues raised above.

Foremost among the recommendations was the desire that the Department of Education exert strong leadership to promote a grand vision for educational uses of telecommunications, and, further, that the Department engage in activities to make the vision a reality.

I. Introduction

Telecommunications technologies are becoming increasingly commonplace in our individual and institutional lives. They exert significant influence on contemporary social, economic, and intellectual life. Their infusion into our society, however, raises a number of important issues and creates problems that must be addressed, in part, through the establishment of telecommunications policies. Such policies have an impact on the deployment of telecommunications technologies in all sectors of society and thus must be carefully debated and formulated.

At the present time, the formal educational system in the United States finds itself in a unique position in relation to telecommunications technologies. In spite of the ubiquitous nature of these technologies in society, education has been comparatively untouched by them. Yet it appears that education stands to gain much from the uses of telecommunications technologies once they are in classrooms. But because the education system has not been a highly active participant in the application of telecommunications for teaching and learning, educators have tended not to be critically involved in the shaping of telecommunications policies.

Recognizing the growing importance of telecommunications technologies and policies for the nation's education system, the U.S. Department of Education is seeking to define ways to influence telecommunications policies for the benefit of education. To that end, the Department, through it Office of Educational Research and Improvement, initiated and supported a meeting designed to explore alternative means of bringing education's interests to tables where telecommunications policies are discussed and formulated. This Report summarizes the outcomes of that meeting.

Following this Introduction, the Report contains a description of the meeting itself. The third part summarizes the main substantive points discussed at the meeting. As part of the meeting, participants were asked to suggest recommendations for involving the education community more effectively in telecommunications policy debate. Those recommendations are described in Part IV of this Report.

In addition to making general recommendations for action, participants were invited to identify more specific priority actions that might be undertaken by the Department of Education. A summary of these targeted recommendations is provided in Part V. In the final section of the Report, the authors offer some concluding observations.

II. The Meeting

On October 10-11, 1991, a group of people representing an array of public and private organizations met at Wye Woods to discuss the roles of education in telecommunications policy. The meeting was organized by the North Central Regional Educational Laboratory (NCREL) and The Aspen Institute's Communications and Society Program. It was supported by funds from the Office of Educational Research and Improvement (OERI), U.S. Department of Education.

As suggsted earlier, OERI requested that NCREL and The Aspen Institute organize the meeting to serve two purposes. First, if education is to benefit from widespread uses of telecommunications for teaching and learning, education needs to be represented in discussions leading to the formulation of telecommunications policy in the United States. Second, it is important for the Department of Education to determine the role(s) it should take in providing coordination and leadership for educational applications of telecommunications.

NCREL and The Aspen Institute planners took considerable care to include a mix of people representing federal, state, local and private agencies, embracing various perspectives and levels of expertise. Appendix A lists all participants. Participants met in a roundtable format throughout the two-day meeting to facilitate dialogue and interaction. The serene surroundings of Wye Woods contributed to the thoughtfulness of participants.

The agenda for the meeting consisted of five discussion sections:

1. *An overview and discussion of current and planned federal telecommunications policies.* This section was framed by papers developed by Fratkin and Bransford; the papers are found in Attachment B.

2. *An overview and discussion of state and local telecommunications policies affecting education.* A paper by Hezel (Attachment B) provided initial stimulus for this session.

3. *An overview and discussion of education's perspectives on telecommunications and telecommunications policy.* A paper by Gooler (Attachment B), together with reaction statements from a teacher (Robert Jacobson), school administrator (Charles Terrett), and state department of education staff member (Daniel Schulte), provided the structure for this session.

4. *An overview of current federal education policy and a discussion of the Star Schools program* by Frank Withrow, the primary Department of Education initiative using telecommunications.

5. *A discussion of action steps and strategies* that might be taken to involve education in the formulation of telecommunications policy.

III. Summary of Major Points

Following are key points that emerged from discussion in the first three sessions of the meeting. These substantive points shaped recommendations made during the final session of the forum.

1. There are numerous telecommunications and educational technology initiatives under way, and while these initiatives often seem to be undertaken with little reference to each other, **there appears to be a "coming together" or integration of multiple forms of technology**, which may result in powerful new services and resources for users.

2. The technology systems that are emerging appear to have tremendous implications for education, yet, in many cases, as they are developed at a state or regional level, **education is not a primary actor in shaping plans for the development and utilization of technology systems**. Education is often not "at the table" as critical telecommunications policy is devised. Failure to be at the right table, at the right time, could have important negative consequences for education's ability to gain access to services available through telecommunications systems.

3. There appears to be **little coordination among agencies and organizations involved in developing and implementing telecommunications policies or systems**, a point underscored by Fratkin and Hezel. As a result, important issues arise pertaining to compatibility, obsolescence, cost, and "user friendliness." These issues have tremendous impact on potential school uses of telecommunications technologies, as schools tend to be virtually immobilized (in terms of technology purchase) in the absence of some agreed-upon standards for telecommunications systems.

4. **Education's need and demand for access to information resources, and the instructional and administrative tools needed to manage those information resources, are clearly accelerating**. Gooler's paper stresses that schools must have greater access to the world's information resources if they are to prepare students with the skills and knowledge that will be needed to survive and prosper in the economic, social, and political arenas of the next century. Schools are one of the few social institutions in the knowledge and information business that have relatively little ongoing access to knowledge or information sources and resources.

5. **Current law and regulations appear to have a negative impact on the capacity of vendors of telecommunications and educational technology products and services to provide the kinds of services and products needed by schools**, and at costs which schools can afford. Current regulatory issues are complex; while opinions differ as to the appropriateness of current regulations, it is apparent that such regulations are having a negative influence on the capacity or willingness of vendors to deal with the needs of the education community. The issue is made complex because regulations originate in a variety of places in national and state government, often without benefit of coordination across originating agencies.

6. Discussion about applications of telecommunications and educational technology in schools seems to fall into three related but distinct subgroups: 1) **national and international electronic highway systems**, 2) **"last mile" technology**, which permits information resources flowing on the national electronic highways to be pulled into individual classrooms, and 3) technology systems that will permit **effective usage of information resources once they are in the classroom**. Much of the discussion at this meeting focused on the first two of these subtopics: the creation and use of national and international electronic highways and the "last mile" phenomenon. It is of little significance to schools to have electronic highways passing near the classroom if there are no usable "off-ramps" into the local classroom. Considerable discussion ensued as to how these issues might be addressed.

7. **Cost factors** are central to any discussion of classroom applications of telecommunications technologies. Most existing classrooms do not even have telephone lines. Substantial costs will be involved in bringing schools to the point where they can use any of the telecommunications technologies now being developed. A massive investment in technology will be needed if America's classrooms are to participate in widespread uses of telecommunications and educational technologies.

8. Telecommunications policies and systems should be influenced by how schools will use such technologies in the classroom. That is, **there must be a vision of the nature of teaching and learning to guide the development of telecommunications systems for education**. The vision of teaching and learning articulated in the meeting, and in Gooler's paper, was one of classrooms very different from those found in most schools

today. Active learners, working directly with a variety of sources and kinds of information resources, will make far greater demands on telecommunications systems. Teachers and learners both will see substantive changes in their roles in the classroom of tomorrow. These changes must be taken into account as telecommunications policies and systems are devised.

9. **Barriers to effective uses of telecommunications in education** needs to be addressed. For example, current teacher licensing and certification requirements and regulations were seen as inhibiting some uses of telecommunications. Teacher and school administrator training (or lack thereof) was seen as a potential barrier to using technologies. The perceived absence of adequate amounts of programming (the content of the electronic highway system) also could be a barrier to widespread utilization.

10. **An overriding concern** expressed throughout each session of the meeting was the matter of **equity**. A central question was: As telecommunications systems are increasingly made available to schools, **how can equity of access be maintained**? Will the gap between the information resources "haves" and "have nots" increase? What are the federal and state government roles in assuring equity with respect to new technology systems?

Each of these ten issues was examined from the many perspectives represented by individuals at the meeting, resulting in different views as to how to frame or approach a particular issue and, consequently, to whom to assign responsibility for addressing each issue.

IV. General Recommendations for Action

During one of the sessions, participants identified actions or activities they believed should be undertaken to promote the involvement of education in setting telecommunications policy, and which would result in policy that would enhance the capacity of the education system to use telecommunications to benefit teaching and learning.

The actions or activities suggested by participants fall into four categories. First, participants defined some **general principles** which underlie their vision of a model relationship between education's goals and telecommunications policy. Next, participants targeted recommendations for action to the **educational community, collaborative projects or agencies**; and **federal and state governments**. As time did not permit lengthy exploration of each recommendation, we include the recommendations as a list of options presented by the group and not necessarily as a consensus statement derived from the substance of the meeting.

It is interesting to note that prior to the meeting, Charles Firestone of The Aspen Institute drafted some principles for the involvement of the education community in debate and formulation of telecommunications policy. His principles, which were not actually circulated at the meeting, can be found in Attachment C. The principles provide not only a broad framework for the actions participants proposed, but also mirror many of the issues brought out at the meeting.

General Principles and Goals

1. **Expand Visions of Education**. Decisions about the structure of technology systems should reflect an integrated, forward-looking vision of teaching and learning, featuring students as active participants in learning and teachers as facilitators for learning. The technology system should promote education's goals, such as providing for pre-school readiness, rural kids, kids with learning disabilities, and kids who are hard to motivate. The system should vastly expand the bodies of knowledge learners and teachers can tap in to. And the technology system should facilitate lifelong learning, and the creation of proactive learning environments.

2. **Design Telecommunications Systems to Serve Educational Goals**. Telecommunications should serve the goals of

education, not the reverse. The principle requires that educational communities determine how telecommunications fits into teaching and learning processes and learning environments and then actively design systems to support this proactive approach.

3. **Assure Equitable Access and Utilization**. Equal access to telecommunications systems and processes for all students is a basic principle that must be stressed in any telecommunications policy or plan. The gap between the rich and poor, the haves and have-nots, must not widen with respect to access to telecommunications systems and the information they carry. Indeed, the existing gaps should be reduced through the design and implementation of telecommunications systems in education.

4. **Encourage Education's Participation in Telecommunications Policy Decisions**. Educators should become involved in the larger telecommunications policy issues, such as deregulation, costs, licensing, compatibility of hardware and software, etc. Educational bodies need to define where their interests lie and then act to protect those interests.

Recommendations to Educators

5. **Add a New Goal for America 2000**. An additional national goal, to enhance the quality of education through the sound applications of telecommunications technologies, should be added to the list of goals for America 2000. [Note: There was a notable lack of consensus on this point; however, since the specific recommendation was, in fact, made by some members of the group, it is included in this Report.]

6. **Improve and Expand Teacher and Administrator Training to Use Telecommunications Technologies Effectively**. Educational institutions must improve programs for the preparation of teachers and administrators to utilize telecommunications technology systems effectively for teaching and learning.

7. **Enhance Public Awareness**. The educational community must help the public (e.g., community members, legislators, administrators) become more aware of the need for and uses of telecommunications systems in education in order to gain public support for initiatives involving telecommunications in education. To start, the education community should document and communicate to the community at large the needs and goals that telecommunications could help to solve.

8. **Create User Support Systems**. A strong system of support must be developed to stimulate the creation and maintenance of a telecommunications-based electronic infrastructure. For example, users must have ready access to training opportunities or people to contact when questions arise. At the very least, educational users should have effective and efficient means of knowing what is available and possible through such a system, through an easily-used catalog of some type.

Recommendations for Collaborative Projects and Agencies

9. **Establish Standards**. Policymakers should establish hardware and software standards to ensure that schools and other educational institutions purchase technology systems that will be compatible with the broader telecommunications infrastructure. For example, Internet and NREN standards for network protocol should be agreed on and adopted immediately. It is also crucial that such standards remain sufficiently broad to accommodate an array of new telecommunications technologies, such as compressed video. Establishing such standards will require cooperation among many sectors, such as policymakers, educators, and vendors.

10. **Form a Financial Task Force**. Educators, policymakers, and vendors should form a task force to explore the financial side of telecommunications usage in the schools: What is necessary to assure the financial feasibility of a telecommunications and educational technology infrastructure for schools? The group should also investigate the needs, processes, and public policy issues associated with providing subsidies for educational uses of telecommunications.

11. **Promote Continuing Evaluation of Technology's Impacts**. Research and development should continue in order to improve our understanding of how telecommunications and educational technologies affect educational environments, processes, and outcomes. Collaborative efforts to study the short- and long-term effects of using telecommunications systems in educational environments would be beneficial to all sectors.

12. **Protect and Promote Policy Interests**. The telecommunications and education communities should identify "pressure points" within federal and state governments and should mobilize appropriate groups and individuals to apply pressure to advance the cause of telecommunications applications in education.

13. **Promote Corporate Support**. The Secretary of Education should engage chief executive officers in telecommunications-oriented corporations (e.g., Regional Bell Operating Companies, cable systems, computer manufacturers) to discuss the uses of telecommunications and educational technologies in education and how such corporations might participate in programs to expand and improve usage.

Recommendations to Federal and State Governments

Federal Responsibilities

14. **Issue Mandates to all Telecommunications Policy Agencies**. Appropriate offices and agencies within the federal government should provide a mandate to all agencies that are establishing telecommunications policies that such policies should promote access by teachers and students to diverse information sources through telecommunications facilities and services.

15. **Issue Mandates to all Educational Agencies**. Officials at the highest level of government should require all educational agencies to evaluate their roles in promoting telecommunications and educational technology systems and strategies in education.

16. **Improve Telecommunications Policy Regarding Service Providers' Limitations**. High level officials in federal agencies should argue through the establishment of appropriate policy, that telecommunications service providers should not be unduly constrained from providing desired or needed services to educators.

Federal and State Responsibilities

17. **Provide Funding for Research and Development**. Federal and state government agencies should fund projects that demonstrate effective uses of telecommunications in education, ensure appropriate evaluation, and disseminate results as appropriate.

18. **Improve Interactions Among Government Agencies**. To bridge the current lack of adequate communication among federal and state agencies, as well as among states, aggressive steps should be taken to increase and improve interactions among federal and state bodies with respect to successful leadership and applications of telecommunications in education.

19. **Subsidize Education's Use of Telecommunications.** Educational use of telecommunications should be subsidized by federal and state governments to assure equity of access to all available telecommunications series. Support also should be provided to develop high quality programming and materials and to help educators create and receive appropriate training to use telecommunications systems.

20. **Resolve Accreditation and Certification Discrepancies.** At present, the varying accreditation and certification requirements in different states present barriers to certain uses of telecommunications systems, such as distance-learning programs carried across and within state lines. State departments of education should work with federal agencies to eliminate these barriers.

V. Suggestions for Priority Activities

Upon completion of the inventory of general recommendations outlined above, participants were asked to suggest what they regarded as high priority activities pertaining to education's involvement in shaping telecommunications policy activities that ought to be undertaken with some dispatch. The focus in this part of the meeting was primarily on actions the U. S. Department of Education might undertake. General recommendations 14-20 (above) reflect suggestions for federal and state agency action; some of these recommendations apply specifically to the Department of Education. In addition to those general recommendations, participants suggested some specific actions to be taken by the Department, including:

1. **Assume a Leadership Role in Telecommunications Uses in Education**. Of highest priority is the need for strong, aggressive leadership from within the Department of Education to promote a vision for the uses of telecommunications in education. Participants argued that the need for a coherent vision is urgently needed. It is perceived that the Department of Education has not created such a vision, nor has the Department clearly provided the leadership necessary for it to articulate or move toward that vision. It was recognized that the Department alone should not be held responsible for all action in this arena, but it should be a strong player.

2. **Assist in Building the Telecommunications Infrastructure**. There is a great need to develop the infrastructure that will permit educators and learners to gain access to massive amounts of information resources at an affordable and equitable cost. Participants acknowledged that components of such a system are currently in place or are being developed. However, there is concern that these components must be melded together to provide a coherent, accessible system for educators. The development of that coherent infrastructure should begin as soon as possible. The Department of Education could play a key role in shaping the design and implementation of the needed infrastructure, with particular emphasis on the "last mile" components of the infrastructure, that part of the infrastructure that provides the connection between the classroom and the many electronic highways currently in existence, and those planned for the future. The Department should have representatives at all

telecommunications policy tables and should have someone within the Department specifically charged with monitoring developments in telecommunications policy formulation.

3. **Collect Information About Barriers to Telecommunications Usage**. The Department should collect (or contract to have collected) information about barriers to effective implementation of telecommunications systems and programs in education and how states might fashion specific remedies to overcome such barriers.

4. **Convene College of Education Deans**. The Secretary of Education should convene a meeting of the college of education deans, and others involved in the preservice and continuing education of teachers, to discuss ways to improve the preparation of teachers to use telecor munications technologies.

5. **Support Ongoing Forum on Telecommunications Policy**. There is need for an ongoing forum to discuss the kinds of issues raised at this meeting. The Department of Education should support such a forum. Four themes or topic areas should provide the framework for an ongoing dialogue:
   - Leadership
   - Coordination
   - Equity
   - Implementation

6. **Support Marketing Information about Telecommunications in Education**. The Department should support systematic efforts to aggressively market information about telecommunications usage in education so that educators are more informed about choices, costs, and consequences of implementing various forms of telecommunications systems in their schools. Such information also should be useful to school board and community members who must be involved in making decisions about, or supporting uses of, telecommunications at the local level.

7. **Model Uses of Telecom munications**. The Department should model the uses of telecommunications systems in education as part of the way it conducts its own business.

VI. The Authors' Perspective

It is prudent to keep expectations reasonable in thinking about possible outcomes of a meeting such as that convened at Wye Woods. The meeting planners (and authors of this Report) hoped for spirited and multi-perspective dialogue about important issues. They also sought recommendations for concrete actions that might be taken to enhance education's capacity to effectively utilize the promise that telecommunications has for improving teaching and learning. The extent to which recommended actions actually occur is influenced by two factors: large government processes grind slowly; and in those public policy arenas in which significant sums of money are at stake, opinions about how and when to solve problems are inevitably diverse and forcefully argued. Telecommunications policies potentially involve large sums of money, many potential vendors, and an array of constituent groups.

There is little question about the nature of the dialogue at this meeting. Discussion was intense, probing, but without substantial rancour or quarreling about fine points of what technologies to use, or in what ways. The discussions tended to frame major issue areas and to focus on the conceptual elements of these issue areas. Very different points of view were always on the table, but these differences focused on critical issues in very positive ways.

The recommendations that emerged were a blend of the general and the specific. Participants quite clearly indicated that the issues identified need to be addressed sooner, rather than later. Cost factors are paramount in any discussion of uses of telecommunications in education, but so, too, are issues of equity and quality. What emerges from an examination of the recommendations is a need for innovative, creative leadership, primarily at the national level, but also at state and regional levels. What is needed is an exciting and comprehensive vision of the way telecommunications systems might contribute to improvements in education at all levels and for all learners. There is also a need to guide the implementation of strategies to thoughtfully, but aggressively, achieve that vision.

Some next steps emerged from the meeting. A definite need exists for continued discussion of these issues, involving a wide range of stakeholders in telecommunications and education. A vision statement is needed as soon as possible. Researchers need to gather and analyze more information about barriers, programs that work, and conceptual models for telecommunications applications in

education. Findings from this research must be made widely available to those who must frame telecommunications and education policy. Mechanisms to build the needed technological infrastructure in education must be defined. This process will involve intricate discussions among service providers and users.

These are not impossible tasks, but they are complex. If the Department of Education is wondering if it can and should play a leadership role in all this, there should be little doubt: the Department needs to exert leadership. It is also clear, however, that the issues are so important, the consequences of action or inaction in this area so critical, that leadership will emerge from one or more sectors of American society, irrespective of decisions made by the Department of Education. Department leadership could, however, help assure that telecommunications and education policy decisions in the future reflect what we know about good education, and could help assure that telecommunications systems in the future are closely linked to appropriate educational goals and values, and serve the best interests of all the people in our nation.

Attachment A: Participants

List of Participants

Dr. Craig Blurton
California Technology Project
PO Box 3842
Seal Beach, CA 90740-7842
213/985-7842
Fax: 213-98509400
Internet: cblurton@atl.calstate.edu

Dr. Lou Bransford
President
Public Service Satellite Consortium
1235 Jefferson Davis Highway
Arlington, VA 22202
703/979-0801

Dr. Judy Brown
Vice President, Cooperative Programs
The Aspen Institute
PO Box 222
Queenstown, MD 21548
301/827-7168
Fax: 301/827-9182

Ms. Catherine Clark
Program Coordinator
Program on Communications and Society
The Aspen Institute
1250 Connecticut Avenue, NW
Suite 700
Washingotn, DC 20036
202/637-6677
Fax: 202/637-9195

Dr. John Clement
Director, K-12 Networking Project
Educom
1112 16th Street, NW
Suite 600
Washington, DC 20036
202/872-4200
Fax: 202/872-4318

Dr. Carter Collins
Office of Educational Research and Improvement
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208
202/219-2194

Mr. John Cradler
Program Director, Educational Technology and Policy
Far West Regional Educational Laboratory
730 Harrison Street
San Francisco, CA 94107-1242
415/565-3018
Applelink: K1686

Mr. Charles Firestone
Director
Program on Communications and Society
The Aspen Institute
1250 Connecticut Avenue, NW
Suite 700
Washington, DC 20036
202/637-6677
Fax: 202/637-9195
Internet: cfiresto@nsf.gov

Ms. Susan Fratkin
Principal
Fratkin Associates
2322 20th Street, NW
Washington, DC 20009
202/466-6093
Fax: 202/775-0902
Internet: sf42@umailsvr0.umd.edu

Ms. Cheryl Garnette
Senior Research Analyst
Office of Educational Research and Improvement
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208-5644
202/219-2267
Fax: 202/219-2106

Dr. Dennis Gooler
Director of Technology
North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60521-4700
708/571-4700
Fax: 708/571-4716

Mr. Peter Grunwald
Vice President
Issue Dynamics, Inc.
901 15th Street, N.W., Suite 230
Washington, DC 20005
202/408-1400

Dr. Jan Hawkins
Director
Center for Technology in Education
Bank Street College
610 W. 112th Street
New York, NY 10025
212/222-6700
Fax: 212/932-1494

Dr. Richard T. Hezel
President
Hezel Associates
1201 E. Fayette Street
Syracuse, NY 13210
315/422-3512
Fax: 315/422-3513
Compuserve: 70771,231

Ms. Beverly Hunter
Program Director
Applications of Advanced Technologies
Directorate for Human Resources
National Science Foundation
1800 G Street, NW
Washington, DC 20550
202/357-7071
Fax: 202/357-7009
Internet: bhunter@nsf.gov

Mr. Robert Jacobson
North View Junior High School
School District 279, Osseo, Minnesota
5869 69th Avenue North
Brooklyn Park, MN 55429
612/561-7932

Ms. Leslie Loble
Senior Policy Analyst
National Governors' Association
444 N. Capitol Street, NW
Suite 250
Washington, DC 20001
202/624-5319
Fax: 202/624-5313

Mr. Charles Lovett
OUS/BS/SERRAD
U.S. Department of Education
Room 3031 FOB6
400 Maryland Avenue, SW
Washington, DC 20202
202/401-3939

Mr. Chalmers Marquis
National Affairs
America's Public TV Stations
Suite 200
1350 Connecticut Avenue, NW
Washington, DC 20036
202/887-1700
Fax: 202/293-2422

Dr. Gary Marx
Associate Executive Director
American Association of School Administrators
1801 N. Moore Street
Arlington, VA 22209
703/875-0737
Fax: 703/841-1543

Dr. Jeri Nowakowski
Executive Director
North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60521
708/218-1022
Fax: 708/571-4716

Mr. Robert Pepper
Chief, Office of Plans and Policy
Federal Communications Commission
1919 M. Street, N.W., Room 822
Washington, DC 20554
202/653-5940
Fax: 202/632-7092

Ms. Charla Rath
Telecommunications Policy Specialist
NTIA, U.S. Department of Commerce
14th and Constitution Avenue, NW, Room 4725
Washington, DC 20230
202/377-1880
Fax: 202/377-8173

Mr. Ray Ramirez
Legislative Assistant
Office of Senator Jeff Bingaman
524 Hart Senate Office Building
Washington, DC 20510
202/224-5521
Fax: 202/224-1810

Ms. Nola Whiteman
Director
Professional Development Center
Bank Street College of Education
610 W. 112th Street
New York, NY 10025
212/222-6700 x578
Fax: 212/932-1594

Mr. Joseph A. Wilkes
Star Schools
Office of Educational Research and Improvement
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208
202/219-2186

Ms. Cheryl Williams
Director
Technology Leadership Network
National School Boards Association
1680 Duke Street
Alexandria, VA 22314
703/838-6213
Fax: 703/683-7590

Mr. Kirk B. Winters
America 2000
Office of the Secretary
U.S. Department of Education, Room 4155
400 Maryland Avenue, SW
Washington, DC 20202
202/401-3080
Bitnet: kwinters@bitnic.bitnet

Dr. Frank B. Withrow
Team Leader
Technology Applications Group
Office of Educational Research and Improvement
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, DC 20208-5644
202/219-2200
Fax: 202/219-2106

Attachment B: Background Papers

Fratkin, Susan	*A Call for Coordinated Federal Telecommunications Policies Affecting Education*
Bransford, Louis A.	*Defining Education's Role in Telecommunications Policy: A Response to Susan Fratkin*
Hezel, Richard T.	*Telecommunications for Education: State Policy Issues*
Gooler, Dennis D.	*Telecommunications Policies and The Needs and Goals of Educators*

A Call For Coordinated Federal Telecommunications Policies Affecting Education

Susan Fratkin

The importance of the government's role in encouraging, supporting, and furthering the development and integration of technology in our schools cannot be overemphasized. Yet there has been no systematic effort by the government to define its role or to propose legislation or regulation which would recognize the importance of integrating technology in response to the changing educational needs of elementary, secondary, and post-secondary students.

Certainly, federal agencies and the Congress recognize the challenges confronting the nation. Until now, however, they have not been able to agree on the necessary steps to meet those challenges.

Unfortunately, the diversity and complexities of both communications technologies and the American democratic system often make communications policy formulation a paralyzing task. Federal communications policymaking is scattered throughout the legislative and executive branches and independent agencies. In addition, the courts, state legislatures, and public utilities commissions are playing an increasingly active and important role.

The educational community has yet to define the role it wishes to play. The fact that merging telecommunications and computer technologies are revolutionizing the rest of the world is not lost on the educational community. However, confronted by a myriad of "opportunities" presented by hardware and software manufacturers, telephone and cable companies, and other communications entities, a certain amount of confusion is understandable. And their problems are actually compounded by federal and state regulations.

All of these factors create a serious void in the political process of tradeoffs and compromises that produce effective policies.

While the federal government has started to assume an increasing degree of leadership in the formulation of a national communications policy, it has yet to focus its efforts on developing a comprehensive communications policy for the educational

community. Despite the flurry of recent activity (passage of the High Performance Computing Act of 1991, FCC hearings on "Networks of the Future," and the appointment of former Xerox chief executive David Kearns to the post of Undersecretary of Education), much is yet to be done.

The time has come when the educational community, Congress, and the appropriate federal agencies must develop the necessary policies, legislation, and regulations to make the current crazy-quilt of regulations affecting education and technology rational, coordinated, and accessible to the students, teachers, and school districts around the country.

To create effective, coordinated policy, three concerns need to be addressed:

1. *The range of activities from the Congress to the federal departments and agencies, including state legislatures, has produced overlapping, conflicting programs and policies and still lacks direction.*

The Appendix to this paper provides in greater detail the many governmental agencies and committees that address educational telecommunications issues at the federal level. The problems can be summarized, however, as follows:

Congress

A plethora of Congressional committees claim jurisdiction over all segments of technology and communications. Multiple House and Senate subcommittees formulate portions of communications policy with circumscribed rules of referral that make it possible for the numerous subcommittees to function, but without coordination, thereby creating the patchwork.

Courts

In the divestiture of AT&T pursuant to an antitrust settlement and the current effort to attain greater autonomy for the Regional Bell Operating Companies (RBOCs), the courts are also playing an important role. But they are often at odds with the Federal Communications Commission or other agencies of government.

States

Currently, the states have emerged as focal points for activity, filling the vacuum created by the lack of a national communications policy. The states, acting in self-interest, either through executive or legislative initiative, have developed plans and provided funding for the utilization of technology to improve education. Several states, such as Oregon, Alaska, Hawaii, California, North Carolina,

and South Carolina, have come to be recognized as examples of areas with exciting and productive uses of telecommunications and technology. Across the nation, however, the result is an unequal approach to the adoption of technology and an unequal regulation of Regional Bell Operating Company activities. Most states have yet to recognize that while education is primarily a state and local concern, technological and telecommunications uses and opportunities have no bounds. They cut across state, regional, and even national lines.

Secondary versus Postsecondary Institutions

Differences between the post-secondary and elementary/secondary communities, furthermore, are striking. Most of the research universities have availed themselves of the opportunity to participate in sophisticated networks (Internet is composed of some 3,000 networks connecting research labs and universities throughout the world) and negotiate volume discounts on services as if they were any other large corporation. On the other hand, fewer than two percent of local school classrooms have access to plain, old telephone service. The mostly copper cables and old analog switches of telephone companies that carry traffic are not supportive of the needs of students and faculty to access research and develop knowledge. Unfortunately, neither the Congress nor the FCC have this as their primary concern.

As the Department of Education's Frank Withrow has noted, schools and classrooms are the sector in our society served least well by telecommunications. According to George Keyworth, former White House Science Advisor, "Public policy has been so preoccupied with Grandma's telephone service (holding down the rates) that it threatens to sacrifice Grandma's children's employment (and educational) opportunities."

Perhaps what is needed is a comprehensive National Information Act, as has been suggested, to cover everything: adoption of a new technological standard, deregulation of Baby Bells, and consolidating control of telecommunications under a single federal agency. George Heilmeier, President of Bellcore, the research arm of the Regional Bell Operating Companies, comments that a "bona fide information infrastructure rather than a fragmented works of different systems for everything" is needed.

2. *Focus within the federal government is only slowly emerging.*

Only recently have several of the federal departments and independent agencies come together to exchange information about programs and activities on educational telecommunications. Some

of these agencies have extensive experience in using learning technologies. Others fund significant research on the topic. But no formal structure exists currently to share information.

Among those efforts which appear to be necessary, but as yet are unimplemented, are: (1) coordination of technology-oriented programs, (2) development of standards in conjunction with the states, and (3) creation of a database to assist agencies in planning programs and evaluating technologies.

On the positive side, those agencies which are involved with research networks (the Departments of Defense and Energy, the National Science Foundation, and the National Aeronautical and Space Administration) have joined forces, putting aside long-standing differences, under the rubric of the Federal Coordinating Council on Science, Engineering and Technology (FCCSET), to plan the implementation phases for the establishment of the National Research and Education Network (NREN). Other efforts to coordinate and cooperate in the formulation of national communications policy are increasing slowly. The long years of lack of consensus among agencies throughout the legislative and executive branches may slowly be coming to an end.

It is now time for more than research-oriented agencies concerned with education-related telecommunications and technology to "join hands," exchange information, and develop joint approaches to issues.

3. *A cohesive focus by educational institutions, associations, and others external to government has yet to develop staying power.*

Two interrelated problems currently face the education establishment.

First, the elementary, secondary, and post-secondary, communities have not yet realized that although some of the issues do not individually affect them directly, a joint approach is critical to success.

Recent experience with the Instructional Television Fixed Service (ITFS) at the Federal Communications Commission (FCC) is indicative of the power that the educational community can bring to bear when confronted by proposed changes deemed harmful.

In the 1960s a portion of the microwave spectrum was reserved for educational use. In the ensuing years, the ITFS service was primarily used to deliver continuing engineering courses to industry and defense sites and education in religious institutions, all

by microwave. In the early 1980s, commercial interests recognized the value of "wireless cable," and sought to have the FCC reallocate most of this bandwidth for commercial purposes. The user community rallied. Representatives from elementary school systems, the postsecondary community, the Public Broadcasting System, and the Catholic Church joined to thwart the commercial interests' efforts. And, in the process, they even enlisted the assistance of the Defense Department, a primary recipient of continuing engineering courseware, to submit letters in opposition to reallocating a major portion of the heretofore reserved spectrum. Working together, this makeshift coalition forced the FCC to reconsider and continue to reserve most of the spectrum for educational purposes.

But these joint efforts disappeared as quickly as they had been established. New ITFS licensees, who might have benefited from the knowledge and experience of long-term licensees, were left to fend for themselves, and, despite retaining the underlying licenses, large portions of the unused spectrum were leased to commercial interests.

Another example of uncoordinated educational community activity in the communications field occurred in the early 1980s, as the process of AT&T divestiture unfolded. Few in the education community were aware of its implications. At the hearings convened by the House Subcommittee on Telecommunications and Finance on the impact of divestiture, educational community representatives spoke to the exciting technological innovations that would be possible after divestiture. However, no one addressed the impact of deregulation on the user community, although at the time education was the third largest user of telephones after banks and airlines. At a minimum, deregulation affected campus telephone service, students, faculty, and the business office. Now it also affects off-campus (distance) education, as well as on-campus classroom uses, research networks, and more. Addressing the issues from the user perspective early in the process may have resulted in more attention to educational needs in the ensuing years.

Second, no umbrella organization exists with educational telecommunications or technology as its focus. Unfortunately, with the demise of the Joint Council on Educational Telecommunications (JCET), which was created when the question of reserving microwave spectrum for education was posed, no organization or ad hoc group has stepped in to state the case for education before the Federal Communications Commission or other agencies, save those law firms representing specific interests.

Conclusion

The telecommunications policymaking players are numerous, each having some responsibilities for telecommunications policy and all having some impact on the educational community. But lacking throughout has been an integrated vision and action agenda. Previous meetings and discussions have concluded that a national comprehensive policy on education, technology, and telecommunications is warranted. They have also suggested that federal departments and agencies, state representatives, governors' offices, and the private sector need to join together to share information about current activities and to develop a coordinated policy of education and telecommunication uses.

The time has come for the educational community—representatives from elementary, secondary, and postsecondary institutions—to join together to assist in the formulation of communications policies that will directly affect their constituencies. They cannot continue to come together as distinct groups (only elementary/secondary or only postsecondary) time and again only to agree independently that they need an integrated vision and agenda. They must actively work together in the legislative and regulatory arenas.

Appendix

Knowing the Players

In order to foster a better understanding of how intra-jurisdictional disagreements, particularly among federal communications policymakers, have an impact upon education, a brief review of the relevant Congressional committees, federal departments, and independent agencies and others follows:

The Legislative Branch

Senate

Committee on Commerce, Science and Transportation
Subcommittee on Science, Technology and Space
(High Performance Computing, Research Networks)

Subcommittee on Communications
(Broadcasting, Telephone, Cable)

Committee on the Judiciary
Subcommittee on Patents, Copyrights and Trademarks
(Home Copying, Revisions to Copyright Laws, Software)

Subcommittee on Antitrust, Monopolies and Business Rights
(Cable TV Systems)

Committee on Energy and Natural Resources
(Research for Networks)

Committee on Labor and Human Resources
Subcommittee on Education, Arts and Humanities
(Education)

Committee on Agriculture, Nutrition and Forestry
Subcommittee on Rural Development and Rural Electrification
(Rural Telecommunications Development)

Committee on Foreign Affairs
Subcommittee on Terrorism, Narcotics and International Operations
(Foreign Broadcasting)

House of Representatives

Committee on Energy and Commerce
Subcommittee on Telecommunications and Finance
(Broadcasting, Telephone, Regulation Oversight)

Committee on Science, Space and Technology
Subcommittee on Space

Subcommittee on Technology and Competitiveness
(High Performance Computing, Networks)

Committee on the Judiciary
Subcommittee on Courts, Intellectual Property and Administration of Justice
(Intellectual Property Rights)

Subcommittee on Economic and Commercial Law
(Antitrust Issues)

Committee on Education and Labor
Subcommittee on Elementary, Secondary and Vocational Education

Subcommittee on Post-secondary Education

Committee on Government Operation
Subcommittee on Government Information, Justice and Agriculture
(Government Printing Office, Freedom of Information Act)

Committee on Agriculture
Subcommittee on Conservation, Credit and Rural Development
(Rural Telecommunications)

Committee on Post Office and Civil Service
Subcommittee on Postal Operations and Services

Joint Committees of Congress

Committee on Printing
(Printing and Distribution of Government Publications)

Although Congress has exerted a substantial impact on the policy process by passing several examples of legislation involving telecommunications and education, it has nevertheless failed to develop a comprehensive telecommunications policy. In Congress, almost any committee or subcommittee could focus on an issue of communications policy, as the critical impact of communications is felt in so many aspects of social, political, and economic life. However, primary responsibility for dealing with communications legislation rests with two subcommittees: the House Subcommittee on Telecommunications and Finance and the Senate Subcommittee on Communications.

One example of legislation emanating from both the House and the Senate provides for the initial creation of NREN, the National

Research and Education Network (a ubiquitous network designed to serve elementary, secondary, and postsecondary students and faculty as well as the research community). The bill stipulates Presidential involvement, specific federal agency participation, and a funding program for the next five years. Although the bill is still in conference, it is notable for its assertion of interagency cooperation (including a little more than $1 million to ensure the Department of Education's participation).

Another example of Congress' efforts to provide the education community with access to technology and telecommunications is the Star Schools legislation, which funds demonstration programs in certain schools across the United States to show how telecommunications technology can be used as a tool to improve instruction in America's K-12 schools.

Congress depends on policy analysis from its support agencies, particularly the Office of Technology Assessment (OTA). OTA has provided Congress with long-term studies of communications issues that relate to education: "Effects of Distance Learning," "Government Dissemination of Information," "Power On! New Tools for Teaching and Learning," "Linking for Learning: A New Course for Education," and reports on "Higher Performance Computing and Networking." Despite these detailed reports and analyses, Congress has yet to heed many of the OTA recommendations.

Other congressional agencies that produce reports relating to education include: the Congressional Research Service of the Library of Congress, the Congressional Budget Office, and the General Accounting Office.

The Executive Branch

The White House - Office of Science and Technology Policy

The role of the Office of Science and Technology Policy (OSTP) has been strengthened immeasurably by the presence of Dr. D. Allan Bromley, the White House Science Advisor. After years of being in the governmental shadows, OSTP has begun developing a leadership role in federal science policy and stronger relationships with other White House offices and agencies.

Dr. Bromley and the OSTP staff have recently played an important role in focusing Administration efforts to coordinate activities among five federal departments and agencies in the High Performance Computing and Communications (HPCC) initiative. (This effort is almost identical to the High Performance Computing

Act of 1991 currently in Congress, save the five-year commitment of funds.)

However, OSTP, while developing an agenda for supercomputing, environmental studies, and biotechnology, has yet to tackle telecommunications policy. It is hampered by a lack of funds (OSTP staff has just expanded from 12 to 40 and gone from a budget of $2 million to over $4 million in two years) and some continuing differences with Congress over the development of a "critical technology policy."

The Executive Departments are responsible for advocating and implementing the Administration's communications policy agenda. Those with primary responsibility are the Departments of Justice, Commerce, Defense, and State. Others, however, including Education and Energy, participate in particular issues. But competition among these Departments frustrates efforts to develop a single position on issues involving communications and technology.

Department of Justice

The Justice Department is responsible for investigating complaints about anti-competitive behavior by communications firms, including evaluation of mergers and the pursuit of antitrust lawsuits. The Justice Department has been active in pursuing computer theft of services and in other criminal activity involving computer technology.

Department of Commerce

The National Telecommunications and Information Administration (NTIA) is the primary coordinator for Commerce Department communications policies.

NTIA, established in 1978 to replace the White House Office of Telecommunications Policy, has responsibility for fostering the development and growth of communications industries. It has completed studies of both broadband and narrow communications policy topics and is about to publish an in-depth study of the nation's telecommunications infrastructure.

Public Telecommunications Facility Program (PTFP) is a part of the NTIA that oversees the program which provides competitive grants for "broadcasting to previously unserved areas." Numerous institutions have received monies to expand their education/public

broadcasting efforts through this program. While its budget has never been large ($21 million was the highest in recent years) the PTFP has played an important role in providing the base funding necessary to broadcast educational programs.

NIST, the National Institute of Standards and Technology, develops and recommends federal information-processing standards and participates in developing voluntary industry standards for computer and network technologies. Currently, NIST is working with Congress to develop federal computer security standards which will affect all contractors, including educational institutions. These standards could have broad, negative implications for data access by researchers (NIST seeks to limit access) and raises serious questions pertaining to academic freedom. The education community needs to be represented in this debate!

Department of Defense (DOD)

DOD is the single largest user of the domestic American communications system and supporter of technology employed in the delivery of education worldwide. DOD programs have been the leaders in providing funding for educational institutions, encouraging them to adopt advanced technology whenever possible. The most notable program is the highly developed distance learning effort serving military based anywhere on land or at sea. The Defense Department has provided support for the development of experimental technologies designed to deliver educational programming, which since have been universally adopted. For instance, the DOD program to design better training for new recruits resulted in the videodisc technology now used in computer classrooms across the nation.

The Department has been highly supportive of "cutting-edge technologies," sponsoring the siting of high performance computers and supercomputers on university campuses, as well as department laboratories. The department-sponsored ARPAnet (Advanced Research Projects Agency) was the first to provide communications among researchers located at government and university laboratories.

Department of Agriculture (USDA)

The USDA Extension Service and the USDA library program services are the second largest distance learning providers, with telecommunication technology linking some 3,150 counties in the

United States. The Land Grant Colleges and Universities' Agricultural Schools are participants in numerous networks (more than 80 were in existence in 1989) supported by the Department of Agriculture.

Department of Education

For years the only programs supporting telecommunications research and courseware delivery were those underwritten by the Fund for Improvement of Post-Secondary Educations (FIPSE). In 1988, Congress created the Star Schools program, which initially funded four projects to support the uses of telecommunications to deliver educational courseware. Now the program involves 1,600 schools in 40 states. The new Department leadership is hinting at the development of a new telecommunications policy.

Congress has recently directed the Office of Educational Research and Improvement (OERI) to create a working group comprised of representatives of federal agencies, Governors' offices, and the private sector to develop an integrated and coordinated policy for telecommunication uses in education.

Independent Agencies

Congress specifically created the **Federal Communications Commission** (FCC) in 1934 to "serve the public convenience, interest, and necessity" and gave it broad, expansive powers.

The Commission, concerned with the regulatory side of telecommunications issues has, until recently, paid scant attention to education issues. The creation of the public broadcasting system brought institutions before the FCC as licensees for both television and radio; one university owns a commercial television station (Iowa State) and several were early licensees of ITFS. Thus until the 1980s with the questions of the reservation of the microwave spectrum for educational purposes and then the impact of new tariff proposals stemming from the AT&T divestiture, few in the educational community knew or really understood the activities of the FCC.

The FCC raises issues on its own initiative, and policies are often suggested by studies completed by the Office of Plans and Policy or by any of its main Bureaus. The recent hearings on "Networks of the Future" included a representative of the educational community addressing the impact of new technologies on educational institutions including libraries. The hearing coincided with the most

active period of congressional activity on the High Performance Computing Act of 1991 (providing for the NREN).

Congressional funding has also resulted in an FCC sensitive to the wishes of Congress. Recognizing this, the education community has been able to bring issues pending before the Commission to the notice of Congress, resulting in their receiving greater attention by the Commission. During the FCC budget oversight hearings, the education community was able to submit questions for Congressman John Dingell to consider when FCC Chairman Mark Fowler appeared before his subcommittee. Mr. Fowler was asked about the pending ITFS reallocation proposal (to move 20 of 32 microwave channels reserved for educational purposes to commercial availability).

Each of the FCC Commissioners has been designated a specific responsibility with Commissioner James Quello serving as the liaison to the educational community for more than twenty years. He has been a long-term supporter of ITFS. (During the fight to retain ITFS, however, it became apparent that the educational community had to reach beyond Commissioner Quello. When the Defense Department letters supporting ITFS were solicited, they were directed to Commissioner Mimi Dawson, who at that time had nominal responsibility for the Department of Defense interests before the FCC.)

The **Federal Trade Commission** exercises "primary" jurisdiction over all matters regulating unfair or deceptive advertising in all media, including the broadcast media. It is well known for its participation in the debate on regulating TV advertising for children.

In addition, the **National Aeronautics and Space Administration** (NASA) and **National Science Foundation** (NSF) are closely involved with educational institutions supporting specialized networking activities and high performance computing research. In particular, NSF has developed telecommunications programs (networking) for elementary, secondary, and post-secondary education. NSF, with its expanding interest in supporting educational training for math and science teachers and the uses of technology, will undoubtedly play a larger role in the future.

State Public Utilities Commissions (PUCs)

These commissions, while admittedly spending only a part of their time on communications issues, have become more involved as the FCC and Congress have moved rather slowly and left a

telecommunications policy vacuum. State PUCs have assumed new prominence as they decide crucial regulatory questions affecting service offerings by the Bell Companies.

Cable Television Franchising Authorities

In many local communities, the cable television franchising authority regulates cable service. Although the 1984 Cable Act preempted much of their power, state and local governments are still responsible for overseeing the use of the public, educational, and governmental access channels. These franchising authorities can use their "bully pulpit" to push for greater cooperation between the cable companies and educational institutions in local areas.

Defining Education's Role in Telecommunications Policy: A Response to Susan Fratkin

Louis A. Bransford

In the past twenty years, concerted efforts by federal agencies, commissions, councils, and task forces have generated numerous reports on a myriad of topics and policy issues associated with educational applications of electronic technologies. As Sue Fratkin has stated in her paper, these efforts have had little lasting effect on federal and state educational policy or on how schools and teachers function.

We are now experiencing a new wave of interest in restructuring of education, instigated by the White House, with corporate America in the lead. Two factors are worth noting regarding the increased involvement of business and industry in the schools: the role of the federal government in promoting greater business and industry participation in the schools and the better use of technology to address the problems associated with educational deficiencies.

The recent reports, "The Unfinished Agenda: A New Vision for Child Development and Education" and "Business Impact on Education and Child Development Reform," by the Committee for Economic Development (CED), call for a strategy that involves a wide range of public and private resources to improve the nation's schools. Telecommunications technology plays a prominent role in both of the reports.

President Bush recently named 11 corporate chairmen to spearhead the New American Schools Development Corporation, a nonprofit organization that hopes to raise $25 million from corporate donations to support research and development teams that, in turn, would assist K-12 schools. Supposedly, an infusion of private funds without bureaucratic strings will yield fresh ideas. The underlying premise is that "Business is beginning to understand that it cannot gripe about the problem without offering some solutions and the money to pay for them."

The Business Roundtable has also published an "Education Public Policy Agenda" that identified the essential components of a successful education system. The document states that corporate America should be at the forefront of change in the schools, and

technology, once again, is mentioned as a tool to raise student and teacher productivity and to expand access to learning.

Ms. Fratkin states that there has been no systematic effort by the government to define its role or to propose legislation which recognizes the importance of integrating technology in education. This is not necessarily so. There are numerous reports that have been written on the condition of education, and explicit throughout are references on how existing and advanced technology can help. There were also 21 education bills introduced in the 101st Congress that had provisions for technology. "Systematic" is a relative term and not a measure of success.

The United States is blessed in many ways. We have expertise and resources to address virtually any problem worldwide. Why then is our educational system in constant turmoil? The irony lies in the fact that much of what we hope for and work for in education is within our grasp. What is so difficult about integrating telecommunications in the educational process? One interpretation is the fragmentation in formulating and managing federal communications policy that dictates how certain educational programs and services are produced, delivered, and regulated. Isn't it interesting that the United States is the only developed country without a Minister or Secretary of Communications? Unless we can establish consistent standards and regulations, even the most ambitious of the federal government or private sector initiatives will not succeed.

Regarding standards, P.L. 102-62 signed on June 27, 1991, created the National Council on Education Standards and Testing with the principal charge of reporting on the desirability and feasibility of establishing voluntary national standards for America's schools. One of the issues the Council is deliberating is the role and function of technology in the schools. This 32-member Council, an outgrowth of the National Education Goals, is required to make a final report with recommendations by December 31, 1991.

The Regional Bell Operating Companies (RBOCs) are mentioned several times in the Fratkin paper, suggesting they will play a greater role in educational telecommunications if and when the courts grant them greater autonomy. I am convinced that the RBOCs will be unleashed in the next Congressional session and that we will see a tremendous growth in systems and services to the home and to the schools. On October 7, 1991, the Federal Appeals Court gave the RBOCs permission to immediately begin providing information services such as stock quotes, sports scores, and news reports. Other information and educational services will follow.

In combination, fiber optics and various compression technologies will open up new, high capacity educational pathways. Cable systems, in anticipation, are proposing to wire, at no charge, every school in the country. The recent full-page ads in the Wall Street Journal and New York Times clearly suggest that the cable industry is worried about the RBOCs' competitive stand. Chris Whittle's Channel One offers yet another distribution alternative. One of the major issues the education community must deal with is how to regulate such services that will ostensibly defy borders, circumvent course approval and teacher certification, and redefine localism and the concomitant autonomy of the schools.

The issue of school choice as a public and democratic system adds another interesting dimension to educational technology. De facto segregation, be it electronic or face to face, can be the outcome of school choice that does not provide for students with socioeconomic and linguistic differences. When electronic alternatives are introduced to address problems of access and equity, too often the information rich get more and the information poor get less.

Ms. Fratkin correctly states that no umbrella organization exists with educational telecommunications as its focus. In the last year, CPB has attempted to take a leadership role by lobbying Congress to funnel educational funds with a telecommunications component through its offices. Congress has not been convinced that the Corporation for Public Broadcasting is the appropriate agent and, consequently, the additional federal funding CPB requested to support its educational initiative was not authorized. Perhaps CPB is the vehicle, but it has to demonstrate that it has an educational constituency before it declares itself the champion of educational telecommunications.

Fratkin's concluding paragraph opines that the educational community has not worked together effectively in the past. The operative word is effectively. There is ample evidence that a multitude of cooperative efforts among educational institutions have taken place; the efforts have just not worked very well for very long. In many cases the absence of a champion to maintain the momentum once the planning meetings are over is a major factor. This lack of continuity has plagued education over the years. Ultimately, the political, administrative, and economic difficulties encountered in implementing recommendations across institutions and geography within the current regulatory infrastructure have been an ongoing inhibiting factor in adoption of telecommunications technology in education.

Who are the candidates for the championship round? Let me renominate three of the players: the National Governors Association has proffered several state and national distribution models; the Council of Chief State School Officers which represents the education telecommunications authority in the state, and CPB which could be a major player if it can muster a broader base of support. CPB just might be the catalyst in bringing education and telecommunications closer together.

Let me suggest who shouldn't take the lead in running the show: the federal government and corporate America. We obviously need federal support and cooperation; and, as educators, we must and will work with corporate America to improve the condition of education, but the sovereign responsibility of the states cannot be shifted or abrogated.

Telecommunications for Education: State Policy Issues

Richard T. Hezel, Ph.D.

Introduction

The role of this paper is to set the stage for the discussion of state level issues regarding education and the use of telecommunications. The conceptualization for the paper is prescriptive, that is, leading toward the development of specific recommendations for telecommunications policy.

The issues for discussion fall around the following areas: state activities in telecommunications policy for education, educators' acquisition and uses of telecommunications, state agency planning and coordination of statewide telecommunications systems, and state telecommunications regulation.

The paper is based on Hezel Associates' continuing research and observations about state telecommunications. Since 1987, with early assistance from the Annenberg/CPB Project, we have been publishing a report on statewide planning for educational telecommunications and the factors that contribute to sound planning and coordination. Our data also formed the basis for the state-by-state description of distance education in the OTA report, "Linking for Learning."

The Growth of Telecommunications-Based Education

The use of telecommunications for education has been documented by many authors (e.g., Hezel, 1987; Hezel Associates, 1990; OTA, 1989; Baldwin, 1991). Annual expenditures on instruction and technical facilities for all levels of education in the U.S. are roughly estimated at $1 billion. Although the cost is a mere fraction of total expenditures on public education, there is evidence that expenditures on education will increase disproportionately to changes in total spending for education. With time, education is becoming viewed as an important and central means of conveying education to citizens of all ages.

Telecommunications resources are being procured by educational institutions for two primary reasons:

1. For the transfer of instructional computing software, school management data, and research data from and to schools and colleges

2. For the delivery of "distance education," via audio, video, and data media

In this paper, abundant references are made to the use of distance education. It should be noted that, while distance education applications constitute just one use of telecommunications, distance education is a powerful and highly visible example of uses of telecommunications that is receiving considerable attention from state legislatures and state telecommunications agencies.

Involvement in Educational Telecommunications Policy at the State Level

To date, across the U.S. few connections have been made among three key groups that might affect the availability of high quality telecommunications services for education. The three groups are: (l) the public service commissions or public utilities commissions (PSC), (2) the telecommunications providers, typically local telephone companies, regional holding companies, and long distance carriers, and (3) the education community, including K-12 and higher education institutions. In increasing numbers, state educational technology leaders have been calling for education community involvement in state telecommunications issues. For example, at the 1990 State Technology Leadership Conference of the Council of Chief State School Officers (cf. Sheekey, 1991), a broad array of technology policy issues was reduced, through prioritization for action, to state and federal telecommunications issues and the role of educators in influencing NTIA, FCC, and PSC policies and regulation.

In a few states, educational involvement in telecommunications policy has resulted from PSC incentive regulation. As the term implies, incentive regulation offers trade-offs of favorable PSC telecommunications regulation in return for the provision of telecommunications benefits for a segment of the community. Incentive regulation in Tennessee, for example, resulted in the application of telephone company overcharge moneys to the development of a distance education project in one region of the state. In Florida, Southern Bell is attempting to dedicate $65 million in overcharges to the development of a network for education, health, or public service.

In our studies of educational telecommunication networks, we have found that planning, policymaking, and implementation is most progressive in states where the governor's office and the legislature are involved in legislation and executive orders that favor the development of distance education and the use of telecommunications by educational institutions. In about half of the states, there is such legislative and gubernatorial involvement.

Often legislative funding for distance education carries the requirement of policy development.

In using telecommunications for distance education, educators confront a host of policy issues that are not directly telecommunications issues, but the issues are related to the use of telecommunications. (See, for example, Hezel, 1991; McGill & Jonsen, 1987; & Sheekey, 1991). In California, for example, the state legislature has passed the Distance Learning Policy Act, which requires the California Postsecondary Education Commission to develop a state policy on the use of distance learning technology. The policy concerns funding and governance issues, credit transfer, accreditation, and educational quality issues. The Colorado legislature created a Statewide Telecommunications Advisory Commission in 1989. The Commission recommended the development of a state network with public and private access by 1995. Unfortunately, in many states policy lags far behind technology implementation, and policy is perceived as an ad hoc solution to telecommunications problems instead of an integrated approach to the governance and use of telecommunications.

The State Role in Providing Educational Telecommunications Services and Policy

Just as states are at the center of curriculum and funding decision making, they are, in most cases, the central unit for the planning and procurement of educational telecommunications, particularly for elementary and secondary schools. State departments of education often develop technology plans and work with other state agencies to form telecommunications networks for delivering instruction to schools. In just a few states, such as New York and Minnesota, school districts, independently or in consortia, plan their uses of telecommunications for distance education.

Equity, Access, and Quality Via Telecommunications

Educators are thrust into the telecommunications era by the notion that technology can expand the reach and effectiveness of educational institutions. Equity, access, and quality are the three terms most often applied to the need for new methods and technologies to reach students. The growing recognition that state education departments are to serve, without prejudice, the instructional needs of all state citizens has fostered the development of educational telecommunications in states. Kentucky, Texas, and Montana are examples of states where equity—or the perceived lack of equity—in the educational system has forced educators to reconsider the way in which education is delivered to schools. Telecommunications is seen as a leveler through which the valleys of underfunded schools are raised and equity is served. Through

telecommunications, even small, rural school districts have access to specialized science and foreign language courses.

The concept of access implies a public right to information and education. Access to education is constrained by both time and distance (Hezel & Dirr, 1991). Individuals who are place-bound through disability or because of obligations require new methods of access to education. Learners, especially adult learners, who have family and occupational responsibilities, need instructional systems that permit them to "multiplex" their coursework with other tasks. Such students, especially at the K-12 level, have specific rights of access to a basic education. Telecommunications is seen as a means of overcoming, in part at least, the constraints.

It is not sufficient to have access to education at a level of some equity with others who receive the benefits of public education. Quality in education is also expected. The characteristic of quality suggests that education, whether it is delivered in person or via telecommunications, will reach a target level of effectiveness.

Equity, access, and quality are the central concepts most often used to define standards for education, especially distance education, and the concepts are most often operationalized at the state department of education level. The first two concepts, equity and access, identify enabling characteristics of telecommunications for education. That is, because of telecommunications, equity in education and access to education by a wider array of potential learners is achieved. The last, quality, is the standard for education against which telecommunications is measured. All instruction delivered via telecommunications is expected to be offered at a level of quality at least the equal of live, in-person teaching.

The provision of quality, telecommunicated education assumes a planned approach wherein expertise in course content, pedagogy/andragogy, audio-visual design, presentation skills, and technology are merged in the development of excellent instruction and delivery. While individuals may possess considerable ability in more than one area, a team tactic is necessary. Of greatest importance here is the convergence of the education team and the technology or telecommunications team. The convergence is an uneasy one for both sides, but there are several strategies to bridge the teams.

The most challenging task in bridging the gap between educators and telecommunications providers is understanding the goals of each team. Some suggestions for action are offered below.

How Telecommunications Providers and Public Service Commissions Can Assist Distance Education

1. Telecommunications service providers need to understand the goals and motivations of the organization that is attempting to offer instruction via telecommunications. In general, the motivations can be classified in one or more of the following goals:
   - Provide educational equity, access, and quality
   - Reach at-risk students
   - Deliver low-enrollment courses to schools
   - (Colleges) Compete for tuition-generating student enrollments

For all of these goals, telecommunications may provide an efficient delivery system.

2. Educators use various schemes in planning and using educational telecommunications within a state. Who leads the development, and the way they plan for distance education, is often a function of pressing instructional need, educational leadership, financing, ability to collaborate, and access to state political leaders, among other factors.

Telecommunications service providers need to understand the idiosyncrasies of state educational telecommunications planning. The levels of technical and management expertise vary widely from state to state. Telecommunications vendors can be very helpful in focusing educators' understanding of telecommunications and its potential roles in education. Vendors also need to use caution to avoid intruding upon the planning functions that are appropriately held by state employees and educators. In many states vendor participation at early stages of statewide telecommunications planning results in bias toward the vendor's technology.

3. The best and most valid state technology and telecommunications plans are those that follow from assessments of instructional needs. Solutions, such as the use of telecommunications or a specific technology, should be viewed as a part of a more complete picture of distance education planning. The chosen technology should follow logically from the needs assessment. Service providers' attempts to direct the choice on the basis of cost alone—or some other non-instructional rationale—are misguided.

4. Several cost issues should be reviewed by telecommunications service providers in conjunction with educators and public service commissions. A recent survey by Hezel Associates indicates that educators expect good quality

telecommunications services at fair and reasonable costs. In particular, educators seek freedom from underwriting the capital cost of laying fiber optics that will be used by the telephone company for profitable purposes.

Educators are also indifferent to the specific technology used for distance education. The inclination to use higher quality terrestrial service, however, is mitigated by the costs of digital fiber optics, as well as by the last mile cost of such a network. Telephone companies can assist distance education efforts by developing special tariffs for education networks. Likewise, service providers can, and in some states do, offer minimal-cost pricing and minimum-use price breaks to education. Those efforts are likely to increase the likelihood and effectiveness of telecommunications use for instruction.

5. State public service commissions and educators need to assess the impact of state telecommunications regulation on distance education and, where possible, arrive at regulatory solutions that benefit the public and the education system, and, at the same time, provide the telephone companies with reasonable opportunities for profit. Until recently, PSCs have made decisions in the absence of significant input from educators. Educators seek regulatory flexibility that makes it easier for telecommunications providers to offer improved service to schools (Teske, 1990; Williams, Schmandt, & Wilson, 1988).

6. States may wish to use incentive regulation and price cap regulation as a means of enhancing the telecommunications infrastructure for education and public service organizations. The dedication of funds that have been collected through utility overcharging is politically sensitive, especially in recessionary times, but the funds represent an unusual opportunity to expand access to education and to make education more equitable. PSCs might offer regulatory incentives, especially for rural delivery of telecommunications services. Allowing accelerated cost recovery accounting on obsolete equipment and on installation of new equipment is a type of incentive that might indirectly benefit educational users (Hudson & Parker, 1990).

7. Telephone companies might, as part of their agenda, make voice telephone service available to all schools. In particular, single-party access to a public switched network should be available to everyone in the United States. In addition, telephone companies should set a goal to provide rural schools with local access to data networks (Hudson & Parker, 1990).

How Educators Can Use Telecommunications More Effectively

1. Educators should be more systematic in their planning and acquisition of distance education telecommunication systems. Our surveys of state planning provide evidence that educators, even when assisted by state planning agencies, fail to adopt a strategic plan for implementation. Educators might focus more closely on the decisionmaking process and the assumptions that underlie decisions.

2. Information from instructional and resource needs assessments are the basis for using telecommunications. Rigorous assessments and the appropriate process of technology selection should be linchpins of telecommunications use.

3. There is evidence that state telecommunications system building and ownership is a lower priority than a few years ago. Educators should understand that the future telecommunications environment is likely to be more conducive to non-ownership. Not far in the future is the availability of dial-up video, voice, and data networks that will offer access to virtually unlimited resources.

4. Educational administrators should set aside a greater proportion of their budgets for telecommunications, which will provide their schools with the window on the world of instructional and information resources. Too few schools give their teachers access to direct dial telephones in the classroom.

5. Educators need to treat distance education policy in more concerted ways. Few states, let alone school districts, have coherent policy treatments of issues such as governance of distance education, the use of technology, administration, marketing, evaluation, program quality, faculty rights, access, accreditation, and teacher certification.

6. Interactivity in distance education has occupied considerable energies of most distance education planners. The assumption has lingered that distance education needs to mimic as closely as possible the type of interaction available in the classroom. To the delight of telecommunications service providers, such an assumption results in requests for, and the development of, costly two-way interactive networks. Substantial research on the role and costs of interactivity is needed.

Conclusion

The use of telecommunications for distance education is burgeoning, but, typical of the adoption of innovations, policy lags behind the implementation and use of telecommunications. In

particular, educators have been noticeably absent from discussions about telecommunications policy. We have cited activities of telecommunications service providers, public service commissions, and educators that are likely to result in more successful and satisfactory uses of telecommunications. Many other regulatory and policy issues will need to be taken up in later forums.

References

Fratkin, S. (1991). The future of information technology in higher education: The federal perspective. *Change*, 23 (1), 46-51.

Hezel Associates (1990). *Statewide planning for telecommunications in education 1990*. Washington, DC: The Annenberg/CPB Project.

Hezel, R.T. (1987). *Statewide coordination of telecommunications in education: A state-by-state analysis*. Washington, DC: The Annenberg/CPB Project.

Hezel, R.T. (1991). Policies for educational technology: A national, state, and local agenda. In A.D. Sheekey (Ed.), *Education policy and telecommunications technologies*. Washington, DC: US Department of Education.

Hezel, R.T., & Dirr, P.J. (1991). Understanding television-based distance education: Identifying barriers to university attendance. *Research in Distance Education*, 3, 2-5.

Hudson, H. & Parker, E. (1990). Information gaps in rural America. Telecommunications policies for rural development. *Telecommunications Policy*, 30 (6), 193-205.

Jonsen, R.W., & Johnstone, S.M. (1991). The future of information technology in higher education: The state perspective. *Change*, 23 (1), 42-46.

Newberg, P. (Ed.). (1990). *New directions in telecommunications policy*. Durham, NC: Duke University Press.

Teske, Paul E. (1990). *After divestiture: The political economy of state telecommunications regulation*. Albany: State University of New York Press.

Williams, F., Schmandt, J., & Wilson, R. (1988). *Telecommunications and economic development: A new state role*. Paper delivered for The Sixteenth Annual Telecommunications Policy Research Conference, Airlie House, Warrenton, VA.

Telecommunications Policies and the Needs and Goals of Educators

Dennis D. Gooler

During the past decade, calls for reform and improvement in the nation's education system have issued forth from large numbers of organizations and agencies throughout the nation. Precisely what is thought to be wrong in the current educational system varies from critic to critic, but there is unmistakably a sense that the education system in the United States is not performing as well as it might, nor as well as it must if individuals are to function effectively and with purpose in a society growing increasingly complex.

As there are many diagnoses of what is wrong with and in our educational system, so, too, are there many proposed solutions. Changes have been proposed for curricula, instructional methods, school organization, funding, teacher education, discipline, length of school day, and almost every other aspect of the educational system. Among the solutions suggested are those that involve the application of technologies for instruction and management. A review of these technology-based change recommendations suggests that telecommunications technologies and processes are increasingly being advocated as potential solutions to educational problems. At this telecommunications forum, *Defining Education's Role in Telecommunications Policy*, it is appropriate that we consider what professional educators, as key participants in the educational system, are attempting to accomplish through restructuring and reform of the educational system, what they believe they need to get the job done, and how telecommunications technologies may fit into the picture. The needs and goals of educators provide one legitimate perspective from which to examine current and pending telecommunications policies and to ascertain how those policies are likely to help or hinder the education reform efforts espoused by educators.

This background paper thus has been prepared as one of several efforts to bring educators' perspectives to discussions of federal and state telecommunications policies. It is, of course, difficult (if not unwise) to claim to represent educators, for that profession is far from unidimensional or consensual in its views on the current state of education and education reform. There have been numerous

attempts to galvanize at least a working agreement with regard to reform strategies and goals, as in the Department of Education's "America 2000" initiative, but it is evident that many perspectives exist on what should be done and how to do it.

The ideas contained herein represent the author's view of some of the educational goals and strategies currently being advocated or pursued as part of education reform efforts. These ideas have been formulated as a result of recent work done in the seven states served by the North Central Regional Educational Laboratory (NCREL), and from a more general scanning of the popular and trade literature about contemporary education. During the course of the Forum, other educators will have an opportunity to agree with, dispute, and add to these perceptions. What is important here is that the perspective of educators be recognized as important in the formulation of broad telecommunications policies that may directly or indirectly impact on the educational system.

The Forum planners (of which the author is one) agreed that background papers should be brief to encourage pre-conference reading by Forum participants. The ideas that follow are thus presented in a somewhat abbreviated form and are intended primarily to stimulate and focus discussion at the Forum about telecommunications uses in education. The goals and needs of educators summarized in this paper are divided into the following categories:

- Teaching and learning
- Teacher training and support
- Administration
- Infrastructure development and maintenance

Teaching and Learning

The vision of teaching and learning outlined in many proposals for school reform stress, among other things, the active involvement of the learner in the learning process, attention to intellectual and emotional skills at many levels, preparation of young people to assume roles and responsibilities in a society characterized by significant change and complexity and increasingly cultural diversity, and needed changes in the role of the teacher from information dispenser to learning facilitator. Some of the implications of this general perspective on teaching and learning include:

Learners:

1. Require access to a broad range of learning resources. To accomplish the kinds of educational goals implied in most reform plans, learners cannot be limited to information available through a single text, or even a small number of textbooks, nor to the holdings of a school library. Learners must be able to access and use a variety of kinds of databases, text sources, software programs, experts, and other sources of information that are both comprehensive and up to date.

2. Must be able to exercise greater active control of their learning resources. That is, learners, to be actively involved in the learning process, must be able to directly manipulate "raw" data, must be able to put information together in many forms, must in short be able to actively create intellectual structures rather than simply respond to structures or frameworks that others have designed. Learners must have both the tools needed for such learning strategies and the knowledge of how to use those tools.

3. Must be able to formulate and carry out individual learning projects and activities. Individualized instruction has always been a goal of educators, but has seldom been realized. In the future, learners must be able to engage in learning activities that reflect their abilities, interests, and goals much more so than has been true in the past.

4. Must also be involved in more collaborative learning projects. The ability to work with others to accomplish desired outcomes is increasingly critical to long-term personal and professional success and satisfaction. The education system must find ways to respond to individual learning needs, but must also stress collaborative intellectual and social functioning.

5. Must gain experience in their early years with the tools and strategies needed in the contemporary and future workplace.

6. Must become functionally literate not only in the traditional sense of that term, but also with respect to science and technology. The demands for an informed electorate inherent in a democratic system of government are significant in a society where the kinds of economic, social, and cultural decisions to be made require high levels of understanding.

Teachers:

1. Must have knowledge of the existence of and access to the kinds of learning resources suggested (above) for learners and must assist learners to gain access as needed.

2. Must have the tools needed to encourage and support learners to become actively involved in the learning process and must know how to use those tools effectively.

3. Must have the tools and skills needed to effectively manage an instructional environment in which learners are directly acting on information resources. Included here are the tools needed to monitor student progress, provide pathways to instructional experiences for both individuals and collaborative groups of learners, and provide feedback on performance to individual students in a timely and useful manner.

4. Must have effective assessment tools and strategies that will provide information on performance consistent with the philosophy of learning being employed.

Teacher Training and Support

Those demanding reform in the educational system inevitably call attention to the need for a well-prepared and supported teaching staff that can function in the kinds of learning environments envisioned for the schools and learning centers of the future. With some exceptions, most teachers currently in the work force (and, some would argue, teachers being prepared today) have not been prepared to work in these kinds of learning environments, and have thus not been trained to use teaching and learning tools appropriate to accomplish the kinds of learning outcomes and processes being advocated. As a result, in their initial preparation and through ongoing continuing professional education, teachers need:

1. Preparation stressing the changing role of learner and teacher in the teaching and learning process.

2. Effective and ongoing training in the use of a broad range of teaching and learning tools that are and will be available in the future. This training must underscore how the tools can facilitate more active learning involvement in and control of the learning process. What must be stressed here is that this training simply cannot be of the two-afternoons-a-year variety, with no follow-up or opportunities to reflect on and implement what is being learned. Involvement in continuing professional education activities must be ongoing and rewarded.

3. Opportunities to interact in a regular and ongoing basis with other teachers and professionals with whom ideas and resources can be shared, problems discussed, and future strategies and programs planned. Teachers need a readily available means to function, as professionals in other fields do, with respect to networks and support from other professionals. Teachers need to begin to see their intellectual and professional environs not in terms of the walls of their building, but as their community, their state, their region of the country, indeed, the global community.

4. A supportive environment in which risks can be taken, failure can happen, discovery can take place. The kinds of learning goals and environments advocated by education reformers are ones in which "risk is safe," where experimentation is expected and supported. Such an environment is <u>not</u> standard today in most schools and classrooms. Teachers embarking on a changed role must do so in a supportive atmosphere.

Administration

The current management of schools has been overtly and implicitly criticized in discussions of education reform. Those who administer schools and other teaching and learning organizations have needs and goals that must be addressed if the education system is to bring about desired reform. Following are some of these needs and goals:

1. Administrators must be able to respond more effectively to calls for accountability. Accountability requires effective and efficient performance of the school, district, or broader system for which an administrator is responsible, as well as a more effective means of systematically gathering, analyzing, and reporting information pertaining to the accountability measures required.

2. Ways must be found to forge new and more powerful cooperative relations among schools, businesses, social service agencies, and other providers of services that may be of importance to the school's teaching and learning mission. These new partnerships must go beyond the often superficial nature of current partnerships.

3. Ways must be found for school administrators to be able to share more effectively information and resources with other schools. Regional information databases, for example, may be of great value to individual schools. Similarly, regional approaches to staff development, research, and the sharing of

exemplary practices may enhance the capacity of a local administrator to improve performance in his or her school or district. The specific needs for cross-school sharing will differ depending on the condition of a given school, but the concept of taking a broader perspective on the availability of resources may be critical to the future success of schools.

4. Administrators at the local level are in need of tools that will permit within-school or within-district management practices to be improved. As one example: administrators are in need of tools that enhance their effectiveness and efficiency in gathering and subsequently reporting information required of them by various state and federal agencies. Data collection and analysis is often redundant and inefficient. Similar concerns are often raised about the processes needed by school administrators simply to stay informed about what is going on in their own school buildings.

5. As teachers need access to information resources to improve their teachers, so, too, do administrators need access to information resources if they are to exercise their responsibilities as curriculum and instruction leaders. For example, administrators need access to sources of research and development information pertaining to various management and instructional practices or strategies.

These are but a few of the areas in which administrators of educational organizations and systems have ongoing needs that must be addressed. As experiments with alternative forms of school organization and service delivery strategies are attempted, the need for systematic evaluation of those alternatives becomes critical, as does the dissemination of the results of those experiments to other educators and policymakers.

Infrastructure Development and Maintenance

The description of educators' needs and goals outlined above makes few references to telecommunications practices or policies. The issues outlined above exist quite independent of the existence of telecommunication capabilities. However, if we can now assume (for sake of this discussion) that educators are interested in using telecommunications technologies, perhaps to address some of the needs and goals outlined above, other needs more specific to telecommunications technologies become apparent. If educators are going to consider seriously the use of telecommunications technologies (as, of course, many educators are already doing), the following issues or needs are raised:

1. If learners, teachers, administrators, and others concerned with teaching and learning are to use telecommunications technologies, those technologies must be accessible to the users. Lack of accessibility to the technology is a major barrier to telecommunications use by most educators and learners. What must be confronted here is the building of a telecommunications infrastructure within the nation's schools. Some hardware and software exist in the schools, but in no way can the saturation level be assessed as adequate to deal with the kinds of teacher, learning, and administrative goals outlined above. The magnitude of the task involved in creating a working telecommunications structure within schools is staggering when one considers, for example, that the bulk of classrooms in America do not even have a single telephone line. In some states, statewide telecommunications systems are being put in place, but the "last mile" phenomenon cannot be overlooked in the case of schools. It matters little if fiber optic cable runs by the school if the school cannot tap into that cable.

2. One of the basic questions to be raised about building a telecommunications infrastructure for schools, of course, is how such an infrastructure will be financed. Much can be said about this issue of how telecommunications systems will be paid for, but suffice it to say at this point that the problems involved in financing such a system seems to many school districts to be insurmountable. The investment in the initial hardware and software is viewed as considerable, but concerns about the costs of using and maintaining a system are also taken very seriously.

3. If one assumes (again, for sake of this discussion) that an adequate telecommunications system is in place, it remains to raise the issue of how data, information, and programming suitable for use in the schools will be created in an amount, and with sufficient quality, to support sustained and widespread use in schools. There is an unfortunate history of schools securing hardware and subsequently being unable to find an adequate amount of software and other programming to make use of the hardware over a sustained period and with an appropriate range of students. Considering the use of telecommunications technologies raises this historical specter in the minds of many educators, some of whom have been burned in the past by this phenomenon.

4. Educators are also concerned about the many issues involved in the integration of technologies into the teaching and learning processes of the school. The ultimate desired end is that technology systems become as transparent as possible, that technologies are simply tools to be used when appropriate. This perspective on technology can be accomplished only to the extent that the amount of technologies available in the schools is sufficient to make technology part of "business as usual." Most schools are a long way from having such resources.

5. To be of significant use to educators, a telecommunications system must permit educators from a given school or district to access resources and information from a broader community. Interest is growing in regional cooperation on many matters; telecommunications technologies should permit educators to tap into regional networks for the exchange of ideas, data, and information. How is this best accomplished?

Summary Observations

Educators considering the uses of telecommunications technologies in their setting ask some or all of the following questions about telecommunications technologies applications in education:

1. Will these technologies make it possible for us to accomplish goals we have for teaching and learning? That is, do these technologies work?

2. What investment do we need to make in the technologies, how much will it cost to continue to use the technologies, and can we justify the costs in comparison to other demands on our resources?

3. Can we make these technologies available to all learners and teachers, irrespective of place or situation?

4. What is the quality of the information, programming, or experience available through the telecommunications system?

5. How will the telecommunications technologies help us do a better job of managing our schools, and reporting our story to those who want and need to know?

6. What kinds of support will be available to us if we try to use these technologies?

From an educator's perspective, good telecommunications policies are those which make it possible and feasible for educators to take advantage of the instructional and administrative powers of telecommunications technologies while reducing the risks and costs associated with being involved. Good telecommunications policies make the telecommunications systems as flexible as possible so that teachers and learners can determine appropriate usage. Good telecommunications policies open avenues for more regional and national cooperation among educators and learners rather than impose boundaries to such cooperation. Good telecommunications policies promote equity in access and quality of product and services available through telecommunications.

Throughout the nation, both educators and learners are gaining experience using various telecommunications systems and technologies. But the record of involvement of schools and other educational agencies is spotty. Within the education system writ most broadly, we do not have a telecommunications system nor do we have coherent telecommunications policy with respect to education. The costs associated with creating a national or regional telecommunications infrastructure that will serve the needs of educators will not come easily or inexpensively, yet it appears that education cannot afford to be without such a system or systems. It is in this area of broad planning and creating a vision for what might be, that attention needs to be focused.

Attachment C: Principles

Firestone, Charles M. *Principles for Educational Community Participation in Telecommunications Policy*

Principles for Educational Community Participation in Telecommunications Policy

Charles M. Firestone

This paper is intended to be a sketch of some principles for the educational community's participation in telecommunications policy forums at the federal, state, and local levels. The premises of the paper are that:

1. Communications and information systems can be important elements for aiding education in (a) learning activities, (b) access to educational resources, (c) teacher training, (d) administration, and (e) evaluation. If we are living in the so-called Information Age and businesses, homes, and government find that information and communications are critical elements of success, it stands to reason that education can and should also take advantage of appropriate telecommunications and information technologies to serve its goals—education and research.

2. The application of communications and information technologies and systems are greatly affected by telecommunications policy, which is decided at the federal, state, and local levels. Clearly, at the federal level, the Federal Communications Commission, the National Telecommunications and Information Administration, Congressional committees, and other agencies affect what communications systems ultimately reach the classroom, what services are available, and/or at what price schools will pay for their communications services. Similarly, communications policy is made at the state public utilities commissions and, locally, in the franchising of cable television systems.

3. Generally, the educational community is not at the communications policy table when decisions are made affecting it. That is, decisions are made every day which can vitally affect education's ability to use communications systems to advance educational goals. Despite the regulatory touchstone of "the public interest, convenience, and necessity," the policy agencies and Congress tend to referee among competing interested parties in setting policy. Often, educators are not included among the mix of competing interests. Yet

most, if not all, regulators would consider the promotion of educational goals as an important part of the public interest.

4. Most likely, the reasons that the educational community is not regularly a player in telecommunications policy are: (a) it does not perceive itself as having sufficient resources to devote to this issue, (b) the topic is a relatively low priority, and (c) its leaders are not sufficient versed in the issues to have confidence in participating in the process. The corollary of this premise is the major thesis of this paper—that with a set of principles, educators at every level could participate in the process with confidence that they could achieve positive results.

Principles

Accordingly, as a starting point for discussion purposes, I offer the following as a set of principles for educators to seek in the communications policymaking process.

1. The recognition and promotion of educational uses of communications and information resources should be one purpose of communications policy.

That is, unless communications policymakers recognize, as one of their goals, the achievement of positive educational outcomes, telecommunications policies and decisions will aid education only as an accidental afterthought. On the other hand, if legislators included this as a specific goal, then education could be included in the regulatory equation throughout the process. Similarly, regulators can explicitly find that promoting educational uses and institutions is an element of the public interest.

2. Educational users and uses should be assured some access to all electromagnetic spectrum assignments, and all other allocations and deployment of communications media, including, without limitation, broadcast frequencies; optical fibers; coaxial cable; multichannel, multipoint distribution systems; direct broadcast satellites; and private microwave systems. Where feasible, a portion of the spectrum, wire, or fiber capacity, or rights of access should be reserved for educational users and uses.

This principle is the starting point for education in the communications policy arena. The allocation of spectrum, or other public resources (right of ways, uses of the streets, regulatory interference, for example) for communications carriers, users, and distributors should recognize education as an important national

goal in the public interest. This principle was established in the reservation of valuable channels in FM radio and television for non-commercial educational stations. The foresight of reserving channels in the 1940s and 1950s later led to the educational and public broadcasting systems in existence today.

Where appropriate and feasible, such as in the assignment of new spectrum for non-military uses, a portion of the spectrum should be reserved for educational users and uses. In communications channels where reservation of space is impractical, such as switched common carriers, rights of access for education should be assured.

3. Along with channel capacity, the government should assure that legitimate educational institutions have the resources to use the channels for pedagogical purposes.

This principle has two elements. First, the channels should be used by educational institutions for pedagogical purposes. This is not intended as a slight to public broadcasting, but by substituting the word "public" for "educational" broadcasting, the system changed to one which has broader public aims than education. There are many ways to teach and to learn, but the point is that the resources in issue should be devoted to those purposes rather than broad entertainment.

The second point, no less important, is that the educational user needs the resources to program the channel. The allocation of channel space without such programming resources is a hollow offer. In today's Information Age, the software, training, and interface to other media are just as important, if not more so, than the hardware. The allocation of the spectrum space should always be accompanied by a recognition that it takes significant resources to program that medium. This is analogous to a teacher having a computer in the classroom, but having no idea how to use it and no software to use in it.

   a. The educational user may sell or lease up to one-half of its allocated spectrum resource to fund or support its use of the remaining half.

As one means for educational users to have resources to program their media of distribution, they could lease or sell, if permitted, a portion of the reserved spectrum to commercial interests. This is analogous to the land grants to educational institutions in the Midwest. In some instances, once the local school district received the land in fee simple, it could dispose of it in any way it desired; for example, building the schools or leasing the land to developers

and using the money to build and support schools elsewhere. The same could be applied here. The school system could sell its cellular frequencies to obtain the money to program other media resources. Ideally, however, there would be a requirement that the money so obtained be used for educational, pedagogical purposes.

b. Any funding of educational users or uses in telecommunications should specifically provide funding for (1) software costs, (2) interface costs, and (3) training costs.

This principle tries to assure that the communications channel or the new technological equipment has adequate support to be easily usable. Attention to the details of software, interface, and training at the planning stages will also help in thinking through the utility of the technology, its capabilities, and its user-friendliness.

4. Educational users should receive broad-based public subsidies to use communications and information systems.

One method for supporting software uses of the channels would be a public subsidy. Telecommunications policy experts today tend to favor subsidies which do not distort economical pricing by carriers. In other words, rather than the age-old method of burying internal cross-subsidies in the rate structure, they recommend that the subsidies be direct and tightly targeted. While difficult politically, this appears to be the most direct, fair, and economic method of subsidy.

Furthermore, by subsidizing users rather than providers (or in addition to providers, where appropriate), the subsidies go directly to the desired uses. This approach can also place the desired user in a position to pay for the communications and information services most suited to its particular needs.

5. Educational users of telecommunications should consider, and be considered for, aggregated telecommunications services with other governmental and public sector users in order to obtain better and cheaper services and products.

The large users of telecommunications tend to receive beneficial services in the marketplace, at least more so than the small or isolated ones. Accordingly, educational, health care, and other public benefit and governmental users should aggregate their demand for services when of a similar nature. They could then receive the benefits of a large customer.

6. The service and pricing scheme should adequately and flexibly address the present and future needs of educational institutions.

Generally, telecommunications companies will meet the needs of major customers. Some educational institutions fit into that category, and their needs will be met just as the needs of any large customer would be. Others, however, may have very important needs which will not be met by simple application of the current rules and/or tariffing procedures. They may need reduced rates, unlimited local calling, or other special treatment. This principle contemplates that the educational institution understands its telecommunications needs and would like to use the technology to meet those needs.

7. The government should promote advanced communications applications for education.

This principle is broad and can include grants for research and development, governmental studies, and governmental subsidies to technologies at the cutting edge of education. Certainly the National Research and Educational Network (NREN) comes within this category.

8. The telecommunications community should educate the educational community as to the uses and cost benefits of the communications and information technologies.

Educators need education themselves as to the beneficial uses of the technologies. Today, vendors are happy to provide such "information," but the information is tainted. This principle would suggest that educators be given an informed advocate to champion their cause at the right forums.

Conclusion

With the adoption of these or any sensible set of principles, the educational community should be better able to participate in the communications policy process and with better results. Recognition of the issue, participation in the process, and follow through in the application should result in better education in our future.